

## PORTABLE-TYPE INFORMATION APPARATUS

**[0001]** This application is a continuation application of USSN 08/885,857 filed June 30, 1997, now allowed.

## BACKGROUND OF THE INVENTION

### 1. Field of the Invention

**[0002]** The present invention relates to a portable-type information apparatus such as a notebook-type personal computer or a word processor, particularly to a portable-type information apparatus which is largely improved in extendability and portability.

### 2. Description of the Related Art

**[0003]** Recently, miniaturization of portable-type information apparatuses such as notebook-type personal computers has been significantly accelerated due to the rapid progress of electronic technology, whereby the user can always carry the information apparatus with him even outside the office.

**[0004]** Information apparatuses, particularly notebook type personal computers, have often been provided with various connectors for the connection of external keyboards, mice, external CRTs, printers or others, for extending the functions thereof.

**[0005]** Since recently marketed notebook-type personal computers have already been miniaturized in size and weight to a large extent, it is difficult to further improve the portability without sacrificing the extendability.

**[0006]** Accordingly, an object of the present invention is to provide a reasonable and economical information apparatus of a portable type improved in operability and portability without deteriorating the extendability, based on a novel technical idea.

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## SUMMARY OF THE INVENTION

[0007] According to one aspect of the present invention, a portable-type information apparatus having an information apparatus body comprises a detachable connector unit provided with a plurality of connectors adapted to be detachably connected to peripheral units and with at least one connector adapted to be detachably connected to the information apparatus body; connection means provided on the information apparatus body, for the connection between the connector unit and the information apparatus body; and a detachable battery unit containing at least one battery and having substantially the same size as that of the connector unit; and wherein the battery unit and the connector unit can alternatively be connected to the information apparatus in substantially the same connecting position relative to the information apparatus body.

[0008] Preferably the battery unit is connected to the information apparatus body through the connection means. Also, preferably, coupling means are provided to transmit electrical power from the battery unit to the information apparatus body. Preferably, at least one fastener unit is mounted between the information apparatus body and the connector unit affording mechanical detachable fixation therebetween. Also, preferably, the connector unit is mechanically detachably fixed to the information apparatus body through said at least one fastener unit. Preferably, the connector unit and the battery unit are alternatively detachably fixed to the back side of the information apparatus body.

[0009] According to another aspect of the present invention, a portable-type information apparatus having an information apparatus body comprises a detachable connector unit provided with a plurality of connectors adapted to be detachably connected to peripheral units and with at least one connector adapted to be detachably connected to the information apparatus body connection means provided on the information apparatus body, for the connection between the connector unit and the information apparatus body; and a detachable battery unit containing at least one battery and having substantially the same size as that of the connector unit, said battery unit being connectable to the information apparatus body through the connection means.

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a1 [0010] Preferably, coupling means is provided to transmit electrical power from the battery unit to the information apparatus body. Also, preferably, at least one fastener unit is mounted between the information apparatus body and the connector unit for a mechanical detachable

fixation therebetween. Preferably, the connector unit is mechanically detachably fixed to the information apparatus body through said at least one fastener. Also, preferably, the connector unit and the battery unit are alternatively detachably fixed to the back side of the information apparatus body.

[0011] According to further aspect of the invention, a connector unit adapted to be detachably connected to a portable-type information apparatus having an information apparatus body comprises a plurality of connectors adapted to be detachably connected to peripheral units; at least one connector adapted to be detachably connected to the information apparatus body; and at least one battery enclosed therein to supply electrical power to the information apparatus body.

[0012] Preferably, connection means are provided for the connection between the connector unit and the information apparatus body and wherein coupling means is provided to supply electrical power from said at least one battery to the information apparatus. Also, preferably, at least one fastener unit is provided between the information apparatus body and the connector unit for a mechanical detachable fixation therebetween. Preferably, it is detachably fixed to the back side of the information apparatus body.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0013] These and other objects of the present invention will become apparent from the following detailed description of the preferred embodiment of the invention, taken in connection with the accompanying drawings.

[0014] In the drawings:

Fig. 1 is a plan view of a notebook type personal computer according to one embodiment of the present invention, in an open state;

Fig. 2A is a perspective view as seen from a front side, and Fig. 2B is a perspective view as seen from a rear side, of the comparator of Fig. 1, illustrating the relationship of a connector box relative to the personal computer;

Fig. 3A is a rear view, Fig. 3B is a top view, Fig. 3C is a front view and Fig. 3D is a leftside view, of the connector box;

Fig. 4 is an enlarged side sectional view of a main part of a fastener;

Fig. 5 is a plan view of a connector box accommodating batteries therein;  
Fig. 6 is a plan view of a battery pack.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0015] The present invention will be described in more detail below with reference to the preferred embodiments illustrated in the attached drawings.

[0016] Fig. 1 is a schematic plan view of a notebook-type personal computer 1 according to one embodiment of the present invention. With reference to this drawing, the personal computer 1 consists of a lower housing 5 which is built in a main circuit board carrying a CPU or other components, and having a keyboard 3 on the upper surface thereof, and an upper housing 9 coupled, in a hinged manner, to an edge portion (innermost side) of the lower housing 5 and having a liquid crystal display 7 in a central area thereof. The upper housing 9 is folded onto the lower housing 5 to form an integral case convenient for transportation.

[0017] On the operator's side relative to the keyboard 3 extending in the central area of the upper surface of the lower housing 5, there is provided a palm rest section 11 wherein a pointing device 13 of a ball type is provided at a center thereof.

[0018] A hinge section 15 is provided along the innermost edge of the lower housing 5, farthest from the operator's side beyond the keyboard 3, for coupling to the upper housing 9 while leaving an upper surface vacant space 17 of about 20 mm wide between the hinge section 15 and the keyboard 3.

[0019] In a central region of the upper surface vacant area 17, a suspend/resume key 21 is provided. The suspend/resume key 21 has a function of interrupting the supply of electric power to electronic parts, including CPU and those relating to the output/input, except for memories, so that the power consumption in the personal computer is restricted (i.e., limited) to a lower level than a normal operating power consumption level.

[0020] The liquid crystal display 7, of a rectangular shape and large size is provided in a central area of the display surface of the upper housing 9. Generally in a lower area of the upper housing beneath the liquid crystal display 7, a so-called state-displaying section 31 is provided in a central region which confronts the suspend/resume key 21 of the lower housing 5 when the upper housing 9 is closed (folded) to the lower housing 5. A sound output section 33 having a

number of small apertures is provided on both sides of the state-displaying section 31.

**[0021]** The state-displaying section 31 has a function of visually displaying whether or not a predetermined electronic device, internal or external to the personal computer is operative or inoperative, and basically consists of an elongated liquid crystal substrate 35.

**[0022]** The rear surface of the lower housing 5, has none of the various connectors for connection to external keyboards, mice, external CRTs or printers which usually are provided in the conventional notebook type personal computer, and, instead, a specially designed common connector 51 which is a combination of the above-mentioned connectors as a single unit is provided. Therefore, a space in the lower housing which would be occupied by these connectors in the conventional computer is unnecessary, and thus, miniaturization of the personal computer is possible. Further, two or more common connectors (not shown) may be provided.

**[0023]** As shown in Figs. 2A and 2B, the common connector 51 on the rear surface of the lower housing 5 (of the personal computer 1) is adapted to be detachably connected to a connector section 55 provided on a rectangular front surface of a connector box 53 (which is also called a port replicator) so that the connector box 53 is detachably mounted to the rear surface of the lower housing 5.

**[0024]** As shown in Fig. 3A, the connector box 53 is provided with various connectors CN on the rear surface thereof, which would be carried on the conventional personal computer.

**[0025]** The connector section 55 on the front surface of the connector box 53 consists of a terminal having 60 pins and a pair of guide pins 57 on both sides thereof for facilitating the connector engagement. The guide pins 57 are engageable with corresponding guide holes (not shown) provided at corresponding positions in the lower housing and also function as grounding connectors.

**[0026]** On both sides of a front wall of the connector box 53 are provided a pair of fasteners 61 for reliably fixing the connector box 53 to the rear surface of the lower housing 5.

**[0027]** As shown in Fig. 4, the fastener 61 basically consists of a threaded rod 63 so as having a thread at a tip 30 end, a main body 65 accommodating the threaded rod 63 so as to be movable in the axial direction and coupled to the threaded rod 63 to be rotatable therewith, and a compression coil spring 67 mounted within the main body 65 for biasing the threaded rod 63





choice.

[0039] While the above-mentioned embodiments are limited to the application of the present invention to a personal computer, the present invention should not be limited thereto but may be effectively applicable also to other portable-type electronic apparatuses such as a word processor.

[0040] As described above, according to the present invention, it is possible to provide a very reasonable and economical portable type information which is improved in operability and portability without deteriorating the extendability. More specifically, according to the portable type information apparatus since a plurality of connectors of various kinds for the extension are removed, the apparatus can be miniaturized in size and reduced in weight. In spite of the removal of such connectors, the extendability is not deteriorated because of the provision of a common connector for coupling a connector box to the personal computer. If a fastening section is provided, the rigid fixation of the connector box becomes possible to enhance the stability and the mechanical strength. If a connector section of a connector box with batteries is coupled to the common connector, the operative time can be prolonged without deteriorating the extendability. If a battery pack is used, the operative time can be further prolonged. If the portable information apparatus is a notebook-type personal computer, the improvement in extendability and operative time enhances the utility of the personal computer.

[0041] Also, the connector box according to the present invention is easily handled and can be mounted to the portable type information apparatus in a simple manner, resulting in an improvement in extendability of the portable-type information apparatus and a reduction in the weight thereof. If a fastener is provided, the connector box can be rigidly fixed to result in favorable stability and mechanical strength. If a battery is provided, it is possible to prolong the operating time without deteriorating the extendability.

[0042] Further, according to a battery pack of the present invention, a further prolongation of operating time of the portable type information apparatus is available. Since the battery pack is mounted to the portable type information apparatus alternatively to the connector box, various options can be adopted in accordance with the desired uses.

[0043] It is to be understood that the invention is by no means limited to the specific embodiments illustrated and described herein, and that various modifications thereof may be made which come within the scope of the present invention as defined in the appended claims.